

*Field Geology Club of South Australia*  
*(Incorporated) Bulletin*

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VOL. 47 NO. 10

NOVEMBER 2018

**ANNUAL GENERAL MEETING AND MEMBERS' NIGHT**  
**THURSDAY 1st NOVEMBER at 7.45pm**

This meeting provides an opportunity to get essential Club business out of the way very quickly and then, enjoy the company of fellow members in a reminiscence of the past year, entertainment, feasting and fun. The evening will consist of three parts:

**1. A VERY BRIEF GENERAL MEETING**

to present the October minutes and Treasurer's report

**2. ANNUAL GENERAL MEETING AND ELECTION OF 2019 COMMITTEE**

Brief reports for the year 2018 will be presented by the President and Treasurer. All committee positions will then be declared vacant and elections held for Officers and Committee for 2019. A nomination sheet is attached to this Bulletin, listing the positions to be filled. Completed nomination sheets should be sent to the Secretary (contact details on the back of this Bulletin). Nominations can also be taken on the night. You can nominate anyone, including yourself, to any position provided you have asked the person if they are willing to be nominated.

NOTE: Our election procedure runs very smoothly, and no-one will be pressured into joining the committee. However, we warmly welcome new members.

For information about this, and any other of the committee positions, please contact Dianne (details on back of this Bulletin).

All of the above business should be out of the way quickly and we can then relax and enjoy our...

**3. MEMBERS' NIGHT.**

The programme will include:

- A "photographic retrospective" highlighting the events during the year, conducted by Mark Dale
- A geological quiz, presented by Ian Lewis.
- great prizes, only 50c a ticket
- And last but not least: **food, drinks and conviviality**, accompanied by "**Show-and-Tell**" for members to show off their labelled rock, mineral or fossil specimens, or any other items of geological interest. Please bring along your geological treasures and enjoy a great evening.

**Please bring a plate of supper to share.**

The meeting will be held in the Mawson Lecture Theatre, Mawson Laboratories, corner of Victoria Drive and Frome Road, University of Adelaide at 7.45 pm.

**Members and visitors are warmly invited to attend.** We are obliged for security reasons to keep the front door of the building locked. Please note that latecomers will not be admitted after 8.00 pm, in order not to interrupt the lecture. Everyone is invited to supper following the lecture. For further information visit: [www.fieldgeologyclubsa.org.au](http://www.fieldgeologyclubsa.org.au)

**Dianne Radomski**  
**Secretary**

## ROCK AND MINERAL WORKSHOP

In this workshop we will consider the properties that make some minerals useful as gemstones; and decide which, from a selection of minerals, could be used as gemstones.

The workshop will start at 6.30 pm, but people are welcome to come in later, as everyone works independently or with a friend.

The workshop will be held in the Sprigg Room. Go past the Tate Museum and take the next staircase on the right. The Sprigg Room is right at the top of the stairs. If you get lost, call Frances on 0403 153 726. Anyone who arrives after 6.30pm and can't get into the building can ring the FGC bell if it is in place, or phone 0403 153 726 and someone will let them in.

**Cynthia Pyle**

## ARE YOU INTENDING TO GO TO THE FLINDERS RANGES WITH FGCSA NEXT YEAR?

If you receive the Bulletin by email, you should by now have received the request from Peter Briggs below in your email. In the email edition there is a form at the end to fill in your intentions for what stages you wish to take part in and the sorts of accommodation you would need.

At this stage your preferences are not binding but, particularly for accommodation, Peter needs feedback now because accommodation is limited and booking needs to be well ahead of the trip.

If you are not on email, you need to complete the form that will be at the AGM or ring Peter at 0418\_883\_473

## PROPOSED FLINDERS RANGES TRIP 24 AUG – 1 SEP 2019 (9 days)

The basic logistics on this excursion have been done and we now need you to respond by 5<sup>th</sup> Nov if you are interested, for it to proceed to the next step.

### Outline

The trip is in four stages. You don't have to do all four stages although most members I expect will.

Most importantly this is a **self- drive trip** and starts at the first location and finishes at the last location in the Flinders Ranges. How and when you travel to and from the Flinders is your choice. We haven't planned for the bus because it would restrict where we could go and not get a lot of use once we are at locations. We would urge members to share travel arrangements so those who don't have transport can still go. You can take your own camper/caravan/tent as well. A group might want to hire a minibus? You only need a normal car licence to drive one of these.

### STAGE ONE

**Pichi Richi Park. Aug 24/25/26.** Here we will spend time looking at the local Geology, doing a geological field mapping exercise/ or sketching (choice), visiting Quorn, and doing the Pichi Richi Railway trip (approx \$65 pp)

**Accommodation** Pichi Richi Park has shared cabin accom and can also cater for us (breakfast/dinner) at a cost of \$75-80 per person per day. Bring your own linen/ towels or pay extra \$18. Shared Male/female Block amenities, no ensuite. If this doesn't suit then you can organise B&B accom in Quorn (15 mins away). Campers also catered for. For more info <https://www.pichirichipark.com.au>

**STAGE TWO**

**Travel to Rawnsley Park, just south of Wilpena Pound, via Hawker, Aug 27/28/29.**

From here we will travel to Bunyeroo Gorge and Brachina Gorge to do some walking on the geological trails .

**Accommodation:** Caravan Park Cabin accom, one Db bed & two sets of bunks ( sleeps 5-6) per cabin, bring your own linen, has cooking facilities but no ensuite. Male/Female block amenities nearby, \$30 per person per night. If this doesn't suit then there are fully self contained Holiday cabins in a different location that can sleep 4-8 , depending if you want to share a double bed.. These vary in price but will cost you approx \$60-\$70 per person per night, BUT YOU WILL HAVE TO BOOK THESE YOURSELF. Campers in the Caravan Park.

The Woolshed Restaurant can provide an evening meal package (\$20 -30), but you will have to provide your own breakfast and lunch. For more info:

<https://www.rawnsleypark.com.au/>

**STAGE THREE**

**Angorichina Village, Parachilna Gorge, via Blinman Aug 30/31.** In this area we will do the Blinman Mine tour (\$27.50/\$20 concession pp) and look at the Blinman Diapir in various locations, plus explore Parachilna Gorge.

**Accommodation:** Bunkhouse accom where you have to bring your own bedding! Again, Male/Female Block facilities next door, no ensuite, \$25 per person, per night. If doesn't suit then you can hire out the fully self contained cabins for about \$50-\$60 per person, per night, BUT YOU HAVE TO BOOK THESE YOURSELF. Or you can hire out some of the cottages in Blinman. They can also do an evening meal package at the Blinman Pub (20 mins away), but breakfast and lunch is your responsibility. Campers also included in caravan park. For more info: <http://www.angorichinavillage.com.au>

**STAGE FOUR**

**Nilpena Station Tour Sept 1<sup>st</sup>,** a tour of the cattle station and you can see where the Ediacara fossils were first discovered by Reg Sprigg. This costs \$135 or \$165 (with lunch), morning start from the Parachilna Pub and includes morning tea,( max 15 persons). If you not interested in this tour then you can make your way back to Adelaide. For more info: <http://www.prairiehotel.com.au> This ends the excursion.

Overall Approx Cost: \$600 pp - cabin/bunkhouse accom + set dinners , 3 breakfasts.

**Doesn't include Tours or Travel. IF YOU ARE INTERESTED THEN WE NEED TO KNOW THE FOLLOWING BY 5th NOV 2018:**

- Who's going? Names& contact details
- Can you take an extra person?
- Do you need transport?
- Will you do all Stages? Indicate
- Are you happy for the club to book you into accom mentioned (ie Cabin/ bunkhouse style)
- OR will you organise your own accom?
- Are you interested in the Dinner packages (Pichi Richi, Rawnsley & Blinman)
- Pichi Richi Railway trip ? Yes/No (approx \$65 pp)
- Blinman Mine tour? Yes/No (\$27.50/\$20 concession pp))
- Nilpena Station tour? Yes/No (\$135-\$165 pp)

## GOOLWA FIELD GEOLOGY EXCURSION 26 AUGUST 2018 MOUTHS, SPITS AND DRIBBLES WITH BOB BOURMAN

We met in the car park for the boat ramp at No 19 Beacon on a sunny but fresh spring day, and our co-ordinator Francis smartly marked off her list of 38 participants (possibly a record attendance). Bob generously handed out to everyone illustrated notes, much of which referenced his publication of 2016 *Coastal Landscapes of South Australia* (University of Adelaide Press). I am sure we were all very impressed by the maps and the historical photographs, especially the aerial views that he included.

The front page showed locations on Hindmarsh Island of desert sand-dune deposits identified as belonging to the Last Glacial Maximum (~18,000 years BP), together with shoreline deposits dated as Last Interglacial (132,000 - 118,000 years ago). These include both back-barrier lagoon deposits and ocean-side deposits, with distinctively different assemblages of shells and sediments. Later in the day we examined some of this material.

From the car park we took to the boardwalk over the Sir Richard Peninsula dunes to the ocean, and were asked to observe what 's to be seen there. In part of an eroded dune Bob Major pointed out Pipi shells in layers of sand, just possibly an ancient midden.



*Entering the dunes*



*Shell deposit*



*Invader*



*Old beach*

Dense vegetation gave way to more open sands, exposed in deflation zones between dune crests, and a profusion of invasive *Euphorbia*, of French origin. Other weedy species were also much evident. In a blowout between two dune crests was revealed another extensive

midden, of Goolwa Pipi shells, mostly of them in fragments but with some consistency of size as all seemed to be mature

Beyond the next (the second) crest we found another deposit of shells, but of numerous different kinds and including juveniles. Thus this was identified as an old beach, at the back of the dune -front that's facing the ocean. So there were three distinct sets of parallel coastal dune-systems, indicating a mobile system and shifting shorelines.

Some discussion about the very heavy vegetation ensued, and the presence of invaders like *Euphorbia* (a French import), and the highly invasive South African Pyp Grass. Other introduced species included Marram Grass and Sea-wheat Grass. Earlier images show this peninsula as a denuded sand-scape, that dramatically improved when grazing stock - sheep and cattle - and rabbits, were excluded. Now another issue has emerged: as the re-growth is so dense in places that new plants do not find space. Bob suggested that unless there is some disturbance, such as a few things being up-rooted in a gale, or a storm, which simply blasts a corridor through, new plants cannot get space to regenerate. Weedy species do seem to have a remarkable resilience in this very challenging environment.



*Grass rhizomes starting to stabilise a blowout*



*Sedimentary rock*

Bob Bourman produced from his pocket a fibrous-algae seagrass (*Zostera*) ball found in the dunes: many of these are tumbled in the surf along south-coast beaches and one has been dated at over 400 years old. Garry had found some calcrete, and some cemented shelly fragments, relics of an earlier beach. Next came a quite detailed discussion of the effects of long-shore drift and its influence on the position of the mouth of the River Murray. The usual daily run of swell waves come in from the SW, which produces the general orientation of the coast and influence the general position of the river mouth. But added into this there's the effect of storm waves: often powerfully wind-driven and also from the SW. These can be strong enough to move all sediment on the beach, whereas the swell waves seem to mainly move finer material.

It is thought that there were once several openings through the Youngusband Peninsula with tides flowing through gaps in the dune systems that are now closed. Evidence for this comes from a 6000 years old oyster shell midden about half way down the Coorong at Hack Peninsula, as the oysters need access to a marine environment. Wave and tidal action dominate over river flow at the mouth since the establishment of the irrigation schemes up stream, and the construction of the barrages, which substantially decreased out-flows from the river.

The Beach along the Coorong is the longest in the nation, and there is a long history of erosion in the record. There's evidence of surveyed roads disappearing as the seas encroach and the coastline moves landwards. Thus it has been estimated that the coast has migrated about 1 km inland over the last 7000 years. This explains why older locations of the Murray Mouth cannot be found, simply because they have been destroyed. Estimates suggest that

there has been about a 6 km migration of the Murray Mouth along the coastline over that past 3000 years. Factors influencing this involve both eustatic sea level shifts, and tectonic faulting. Generally the Murray Mouth area is sinking and the Mount Lofty Ranges are rising as indicated by the offset of the last interglacial shoreline. Such tectonic movements were a result of fault-line shifts, associated with the separation of Australia from Antarctica, as well as 'load variations' associated with sea-level changes due to how much water was locked up in the ice-caps. The Mt Gambier volcanism also had effects.

In the midst of this fascinating discussion the tide had moved well in, when several vehicles roared past on their way back to town from the Murray Mouth. They were diving very close to the base of the dunes. This is most destructive for sand-nesting birds, and destructive of the inter-tidal littoral community of microbiota, forams and the like. It also destroys any old back-water deposits that may be revealed with the migration of the modern dunes inland.



*Destruction of beach microfauna*

Next we all moved to the Barrage location for a picnic lunch, and a walk out on the Barrage to observe the fish ladders. A question arose as to whether there had ever been mangroves in the area. Bob Bourman said that initially he had thought it likely that south of say Murray Bridge, the river and its lakes were estuarine in character, but things are not that simple. Most of the time it is now believed that the lakes were fresh water, due to regular seasonal flows coming down stream. Sturt described the lakes as fringed by freshwater reeds, and made no mention of mangroves. There were also freshwater mussels and other molluscs present. The Barrage has its major function of separating the fresh water and preventing saline waters invading up-stream areas. If the Barrage was moved to say Wellington, then that would happen, as sea-water would migrate up-stream to the detriment of enterprises and the ecological environments now depending on fresh waters. 1981 saw the first total blocking of the river mouth. It needs to flush out, and good fresh water flows are a must. For about 700,000 years the Murray has flowed out to sea around about here. Meanwhile the salinity levels in ground water is rising, due mostly to land clearance. We noted that whilst Lake Albert has an inlet, there is no outflow from this lake, and the saline ground waters from cleared land that enter this lake get concentrated.

The third stop was on Hindmarsh Island to observe dredging in progress, and Bird Island. Dredging is carried out to keep the mouth of the river open: but in the past flows from up-stream accomplished this. No natural flood since the Millennial Drought has been sufficient: due to the extraction of water up-stream. It is a costly solution to a perpetual problem, quite of our own making. Dredged sand is dumped on beaches either side of the mouth. Barker Knoll, a large dune on the SE side of the mouth has been eroded in the past but the area to the southeast has been relatively stable for quite some time, (after the last sea level rise of about 7000 years ago), unlike the mobile sands that make up the spit opposite (Pullen Spit).



*Dredging*

We observed Bird Island, with its central almost spherical central dune (maybe more like a donut, with its hollowed out top). This feature was merely a sand spit when the Barrages

were constructed, but it has been accumulating more and more sand for 70 years since. It is now 1000 m across and 2 m high, colonised by at least 80 plant species over the last 70 years or so. It has almost blocked the Mundo Channel which once was a major out-let for the Murray. So suggestions that it might be removed, by for example carting the sand to depleting Adelaide beaches, was shelved as the muddy sands were deemed unsuitable. And in any case, the location of the mouth does migrate, and a map of its various positions at 10 intervals from 1839 to 1967 gave us a dramatic and very graphic picture. Today it is substantially narrower, than say in 1839.

Final stop for the day was in the town of Goolwa, at a recently excavated wetland. These works revealed a 125,000 year-old back-barrier lagoon environment, littered with clay and shells not cemented together, and quite different to the open ocean 'pipi' or Goolwa cockle. These shells beds are dominated by estuarine shells *Notospisula trigonella*, with rare juveniles of the now locally *extinct* *Anadara trapezia* or the Sydney blood cockle. Much excitement buzzed through the group as several people found twin-shells attached, entire and articulated, preserved in their living condition. The sandy-clay indicates that they lived in a Coorong- style lagoon typical of a back-barrier wet area. This takes us full circle, as this deposit lines up very nicely with the old shorelines marked across Hindmarsh Island on map 1, and dated as Last Interglacial.



*Goolwa wetland*

Delighted with an informative and very interesting day that ended with a bit of a treasure hunt, Bob accepted our hearty thanks and his gift of a bottle of wine, whilst a lucky few made off with 125,000 year-old shell-treasures. I am sure some at least will be back for another closer look.

**Alvena Hall**

### A FEW REMINDERS

1. Your subs for 2019 are due. See the enclosed form.
2. The annual picnic will be on Saturday 24th November, Details last month.
3. The annual dinner will be on Friday 9th November. Details 2 months ago. Sign up at the AGM or E-mail Steve Elsbj. The Committee has agreed to subsidise this event, and **members attending the dinner will receive a \$10 refund on the night.**

### THE PRESIDENT MAKES HIS MARK

Our illustrious leader won two gold medals at The Australian Festival of Marmalade against local and interstate competitors for his Calamondin (Kumquat) Marmalade.

The festival was held at the National Trust's Beaumont House in October 2018.

**Steve Elsbj**



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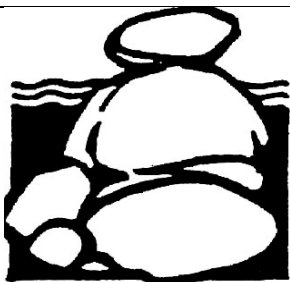
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